

Second Language Vocabulary Learning From Context Clues: A Review of Research in the Past Decade and Implementation in Digital Environment

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Review Article

Abstract

This article reviews empirical studies from the past decade in learning second language (L2) vocabulary from context clues. Previous studies conclude that guessing unknown words from context clues is not an effective vocabulary learning strategy. Rather, it should be employed as a complementary approach. In alignment with this standpoint, review of the most recent empirical studies reveals that merely relying on context clues does not lead to the most effective L2 vocabulary learning. The learning result highly correlates with the learners' language proficiency. However, recent studies did not downplay the role of incidental vocabulary learning from reading. More researchers explore the appropriate types of vocabulary for inferring from the contexts and the corresponding pedagogical strategies. This article concludes with pedagogical implications of teaching L2 vocabulary in digital environment.

Keywords: Context clues, vocabulary learning, reading, second language acquisition, digital learning

1. INTRODUCTION

Using context clues to infer unknown words during reading is a commonly used strategy for both first language (L1) and second language (L2) readers. Different from L1 readers, L2 learners may find this a rather difficult task due to limited reading comprehension capacity in the target language. Indeed, compared to consulting a dictionary, guessing word meanings from context clues can be less disruptive for extensive reading. Yet, whether this reading strategy can lead to effective vocabulary learning and successful comprehension of the text, research suggests various findings.

Based on numerous empirical studies, Folse (2004) concludes that guessing word meanings from context clues does not necessarily contribute to effective vocabulary learning. Instead, it requires L2 learners to master a large size of vocabulary in order to guess accurately. Folse suggests that using context clues can be employed as a compensatory strategy for reading comprehension rather than a main vocabulary learning method. Thirteen years after Folse's book was first published, the field of vocabulary teaching and researching has reached to a new altitude. Meanwhile, using context clues for L2 vocabulary learning continues to be a

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controversial practice. To achieve the most effective L2 learning and teaching approaches, it is crucial to have a thorough analysis and understanding of the effects of using context clues in L2 vocabulary learning. Hence, this review article synthesizes empirical studies that were conducted in the past decade to obtain state-of-the-art implications for L2 vocabulary learning and pedagogical practice.

2. CAN L2 LEARNERS SUCCESSFULLY LEARN NEW VOCABULARY FROM CONTEXT CLUES?

In this section, five empirical studies are analyzed to address whether L2 learners can successfully guess and learn vocabulary from context clues. The summary of the studies can be found in Table 1.

Kondo-Brown (2006) investigated how English L1 learners of advanced Japanese ($N = 42$) infer unknown kanji (Chinese character) words in context. Decontextualized and contextualized kanji tests were conducted to the same group of participants. The results suggested that the participants failed to guess most unknown target words, with a successful rate of 16.7%. In addition, the participants did not perform equally at guessing the meanings of the unknown kanji: participants with higher proficiency in reading can use context clues significantly better than the less proficient ones ($p < .001$). The author notes that inferencing unknown words in context are most likely to occur only when L2 learners are equipped with adequate vocabulary knowledge.

Hamada's (2014) study compared L2 learners' lexical inferencing abilities of using context clues and morphological information ($N = 107$). The participants were asked to answer 20 multiple-choice questions to infer the meanings of the pseudo compounds in both morphology reliable and unreliable conditions. The results indicated that the participants' lexical inference abilities were influenced by their proficiency levels in morphology unreliable condition. The high-intermediate and advanced groups were better at choosing the answer option based on contextual information than the beginning group did ($p < .001$), whereas the beginning group chose the answer option based on morphological information more often than contextual information. This finding aligns with Kondo-Brown's (2006) study, noting that merely providing context clues do not lead to successful lexical inference and L2 learners' proficiency level largely influence their abilities of using context clues in guessing the word meanings.

Another study examined the participants' explicit and tacit lexical knowledge that developed incidentally for novel L2 words through reading a long continuous text (Elgort & Warren 2014). Different from the above two studies, Elgort and Warren argue that text length itself can be a factor influences L2 learners' lexical inferencing and reading comprehension; meanwhile, both explicit and tacit measures should be included to gain a full picture of the participants' learning of the target unknown words in context. The study used a long connected text in a non-experimental environment. Forty-eight advanced and high-

intermediate adult L2 learners were recruited and asked to read a 40,000 words expository text within 10 days. Participants were required to read the text with 48 target pseudowords without using a dictionary. After completing each chapter, their explicit and tacit knowledge of the target words as well as comprehension of the text were tested by using different methods. The result shows that 10 out of 48 pseudowords were learned by the participants, which suggested a modest vocabulary gain. Again, the results of this study demonstrated the influence of proficiency level on learning of unknown words in context as in previous studies. Moreover, the target words' positions in the context, degree of keyness, and concreteness also have significant impacts on learners' vocabulary learning. Elgort and Warren suggest that inferring word meanings from context only is not enough for reliable vocabulary learning and contextual word learning is a rather slow and incremental process.

Nevertheless, there are studies indicate the potential positive effect of guessing vocabulary from context clues. Ebrahmain and Nabifar (2015) compared the effect of three vocabulary learning strategies, including word-part, word-card, and context-clue methods. The experiment included 60 Iranian high school students for a 4-week period. The three experimental groups were instructed by a same teacher to learn 40 new vocabulary, each group received one treatment of vocabulary learning method. After the instructional phase, immediate and delayed posttests were conducted to examine the effects of different treatments. The results indicated that context-clue strategy yielded higher test scores than the other two strategies in both immediate and delayed posttests ($p < .05$). Yet, the results of this study are not unquestionable. First, no control group was involved. Thus, whether the posttest scores of each group were results from the treatments needs to be discussed. Second, the difficulty level of the learning task was quite unchallengeable for high school students. Therefore, one may argue that the students should be able to learn 40 new vocabulary over 4 weeks no matter what kind of learning strategy is used.

Overall, most well-designed research did not yield considerable effectiveness and efficiency of using context clues to learn new L2 vocabulary. It is highly based on the learner's existing L2 proficiency and vocabulary size. However, this does not mean that teachers and learners should downplay the importance of incidental learning through reading. Pigada and Schmitt's (2006) case study reveals that if 95% of the vocabulary was known to the participants, substantial learning of the target words occurred during the extensive reading treatment. Hence, when the learner masters sufficient vocabulary, vocabulary learning from context clues is more likely to take place.

Table 1. Summary of empirical studies.

Study/Year/ Journal	Research Questions	Participants	Methodology	Results
Kondo-Brown, (2006), <i>Language Learning</i>	How do English L1 learners of Japanese in advanced level infer unknown kanji words in context?	42 English L1 learners of advanced Japanese at a US university	16 target kanji; decontextualized & contextualized kanji test; two reading comprehension tests to check proficiency levels.	<ul style="list-style-type: none"> - Most participants cannot successfully guess the meanings (16.7%); - More proficient participants can use context clues better; - Adequate vocabulary knowledge is needed.
Hamada, (2014), <i>The Modern Language Journal</i>	How does the choice of information (morphology or contextual) in lexical inference differ depending upon the learners' L2 proficiency and the reliability of the morphological information?	107 IEP participants in beginning, intermediate, high intermediate, and advanced levels.	20 multiple-choice items; two sentence conditions: morphology reliable & unreliable	<ul style="list-style-type: none"> - Proficiency level influences lexical inferring under morphology unreliable condition; - The beginning group based more on morphological information; the advanced groups could use more contextual information
Elgort & Warren, (2014), <i>Language Learning</i>	How does lexical knowledge develop incidentally for novel L2 words through reading a long connected text?	48 advanced and high-intermediate adult L2 learners from diverse L2 backgrounds	40,000 words text read within 10 days, 48 pseudowords, 95% lexical coverage by the first 7000 most frequent English words, comprehension & word retrieval questions, asking word meanings/synonyms	<ul style="list-style-type: none"> - Modest vocabulary gain: 10/48; - More advanced participants were more likely to learn the meanings of target items after fewer encounters; - Other influential factors: spacing of repetition; keyness, concreteness, gender, etc.
Ebrahimain & Nabifar, (2015), <i>The Journal of Applied Linguistics</i>	Are there any significant differences among the word-part, word-card, and context-clue strategy groups in learning vocabulary?	60 EFL Iranian high schoolers	3 experimental groups 40 target vocabulary; 4 weeks training; post tests of choosing synonyms	<ul style="list-style-type: none"> - Context-clue group yielded higher immediate and delayed posttest scores than the other two groups.
Pigada & Schmitt, (2006), <i>Reading in a Foreign Language</i>	Does extensive reading lead to increased word knowledge in terms of spelling, meaning, and grammatical behavior of words?	One 27-year-old intermediate level French learner	133 target words; 95% of the words are known to the participants; Sensitive measurement procedure, multiple sensitive tests of word knowledge	<ul style="list-style-type: none"> - Substantial learning of the target words occurred during the extensive reading treatment; - 65% of the target words was enhanced in some way; - Spelling was strongly enhanced.

3. WHAT TYPES OF VOCABULARY ARE EASIER TO BE INFERRED THROUGH CONTEXT CLUES?

If guessing unknown words from context clues is still an option for classroom teachers, it is necessary for them to know the preferable types of the target vocabulary. In this section, I examine three empirical studies to investigate the types of vocabulary that are easier to be guessed from context clues. Table 2 presents the key points of the three studies.

Van Assche, Duyck, and Brysbaert (2013) explored cognate facilitation effect of verbs and the influence of verb tenses in inferring unknown words in sentence contexts. The first experiment examined the participants' L2 lexical processing abilities ($N = 46$). The participants were asked to make quick decisions on judging whether a presented word in minimal context was a real English word or not. The presented words belonged to cognate or non-cognates categories. The results suggested that the 1) cognates were recognized more quickly and accurately than non-cognates; 2) present tense verbs were recognized more quickly than past tense verbs. The second experiment of the research tracked eye movements, indicating that present tense verbs were read more quickly than past tense verbs in terms of skipping rates and gaze duration. Overall, the results of this research favor the advantageous role of cognates and verbs in present tense in L2 lexical recognizing or inferring.

Mestres-Missé, Münte, and Rodriguez-Fornells (2014) addressed the concreteness effect of the target vocabulary in learning words from verbal contextual information. One experiment focused on the learning of an abstract new word from contextual information. Eighteen undergraduate Spanish-Catalan bilingual students were involved. Three sentence conditions were created for embedding the 36 target abstract words into sentence contexts. The conditions included meaningful condition, non-meaningful condition, and real-world condition. Participants were asked to write down the meaning of the new word or a synonym. In alignment with a previous study (Mestres-Missé et al. 2007), the result reveal that abstract words were generally processed slower than concrete words. Another experiment in the research also reached the conclusion that concrete word meanings were discovered and learned faster than abstract word meanings even when matched on context availability. Elgort and Warren's (2014) study supported the findings, revealing that chances of robust learning were higher for more concrete lexical items.

Golonka, et al. (2015) discussed the role of lexical context for native English speakers in learning Arabic L2 vocabulary. Overall, the study suggested learning vocabulary from reading for comprehension was less effective than learning from vocabulary-focused decontextualized or semi-contextualized tasks. The researchers note the necessity of scaffolding activities and word-focused activities in facilitating L2 reading and word learning. Due to the features of Arabic language, the meanings of the roots helped the participants guess the meanings of unfamiliar words. Thus, for specific languages, it is beneficial to consider the morphological forms or word parts to promote word guessing.

Table 2: Key points of the three studies.

Study	Major findings
Van Assche, et al., (2013), <i>Studies in Second Language Acquisition</i> .	1) Cognates were recognized more quickly and accurately than non-cognates; 2) Present tense verbs were recognized and read more quickly than past tense verbs in terms of skipping rates and gaze duration.
Mestres-Missé, et al, (2014), <i>Second Language Research</i> ; Mestres-Missé et al, (2007), <i>Cerebral Cortex</i> ; Elgort & Warren, (2014), <i>Language Learning</i> .	1) Concrete word meanings were discovered and learned faster than abstract word meanings even when matched on context availability; 2) Chances of robust learning were higher for more concrete lexical items.
Golonka, et al., (2015), <i>The Modern Language Journal</i> .	1) For Arabic as a L2, the meaning of the roots help the participants have a better chance to guess the meaning of unfamiliar words; 2) Morphological forms or word parts are beneficial for promoting word inferencing

4. PEDAGOGICAL IMPLICATIONS

Despite limited strengths that context clues have in vocabulary learning, incidental learning and using contexts to facilitate reading should not be neglected as extended reading can lead to larger gains accumulatively. In this section, pedagogical suggestions from three studies are provided for teaching L2 learners to use context clues for vocabulary learning and reading. Summary of the studies can be found in Table 3.

Karbalaei, Amoli, and Tavakoli (2012) suggested that using context clues can be an effective word learning strategy if students were explicitly taught on how to use them. The strategies the researchers noted include locating appositives, searching for explicit definitions or explanations within the text, and using prior knowledge while reading etc. However, educators should keep in mind that the effective use of these strategies requires one's solid mastery of the neighboring vocabulary and context knowledge.

Regarding presenting unknown words occurred in contextual reading, Ko (2012) investigated the effect of L1 and L2 glosses. The participants ($N = 90$) read texts under no-gloss and glossed conditions, later were tested with target vocabulary from the texts. The immediate vocabulary test indicated a significant difference between no-gloss and glossed conditions. L2 gloss group achieved the highest scores, with L1 gloss and no-glossed groups following. Overall, compared to risky and misleading results of guessing unknown words from context clues, glossing has a positive effect on L2 vocabulary inferencing and learning. Moreover, the participants expressed their preference for L2 glosses over L1 glosses.

Lastly, Webb (2008) advised the importance of the quality of the contexts in gaining knowledge of word meanings. In his study, participants in experimental and control groups were asked to read target words with more and less context information that was known to them, later their knowledge of the target words was tested in terms of recall of form, recognition of form, and recall of meaning. The findings supported the effect of contextual richness in acquisition of meaning. The results also showed that the meanings can be learned relatively quickly with repeated occurring of the unknown words.

Table 3: Pedagogical suggestions of the three studies

Study	Pedagogical suggestions
Karbalaei, et al., (2012), <i>European Online Journal of Natural and Social Sciences</i> .	1) explicit teaching and scaffolding of using context clues; 2) locating appositive; searching for explicit definitions or explanations within the text, using prior knowledge while reading; 3) a strong mastery of neighboring vocabulary is needed.
Ko, (2012), <i>TESOL Quarterly</i> .	1) Glossing can have a positive effect on L2 vocabulary inferencing and learning. 2) the participants expressed their preference for L2 glosses over L1 glosses.
Webb, (2008), <i>Reading in a Foreign Language</i> .	1) positive effect of contextual richness in acquisition of meaning; 2) if the unknown words repeatedly appear in informative contexts, the meanings can be learned relatively quickly; 3) all the running words in the contextual sentences need to be known.

5. USING CONTEXT CLUES IN DIGITAL ENVIRONMENT

Even though context clues have not been researched as the most effective approach to enlarge individual's L2 vocabulary size, classroom teachers, educators, and L2 learner themselves may still use context clues as a common way of referring meanings of unknown words. In particular, with the increasing number of digital texts available, it is necessary for readers, either L1 or L2, to take better advantage of context clues in understanding the texts efficiently. However, with limited vocabulary size of the target language, L2 learners need more assistance in using context clues. In this section, an example of using context clues in digital environment is provided.

Data-Driven Learning (DDL) can be used in digital environment as an effective approach to assist L2 vocabulary learning through context clues. This approach aims to help learners to engage in target language through accessing larger linguistic data (Johns, 1991). Corpus-based approaches are commonly used in DDL for L2 learning. A corpus is a large collection of naturally-occurred written or spoken language. Hence, corpus-based approaches help learners analyze how the target vocabulary is used in an authentic setting and further their understanding of the specific vocabulary.

Recent development in technology enables teachers and students to use corpora to analyze authentic language data through concordance lines, namely occurrences where the target vocabulary were used in previous contexts. Using concordance lines can be considered as an application of DDL. For example, Corpus of Contemporary American English (COCA) has been used by many researchers, teachers, and learners. The current size of COCA is more than 560 million words which include texts from different registers, such as spoken, fiction, and academic texts (Davies, 2008-). By searching the unknown words, users are able to access all the previous occasions where the particular word has been used and read through the concordance lines. Without looking up the dictionary, users might be able to figure out the meaning of the unknown word in various examples and extend their reading opportunities. Table 4 illustrates an example of concordance lines of the word *contemporary*.

Table 4: Concordance lines of the word "contemporary" on COCA

1	2011	ACAD	and has been perpetuated by the art market. The first sales of modern and contemporary Southeast Asian paintings at Sotheby's in Singapore prominently featured the works of European artists
2	2007	ACAD	"? # Even if that is so, we claim and proudly mobilize as contemporary " others ", finding ourselves at a point in time, little more than
3	1990	MAG	the garbage can. # That said, it must also be added that our contemporary interest in ornamental grasses has almost nothing to do with early-20th-century horticultural traditions or the
4	2003	ACAD	now awaits the pilgrim and tourist alike (Figure 6). A new, contemporary, Trinidadian-style temple has been built on a platform behind the original one, and
5	2011	MAG	walls-a step removed from the traditional estancia-hint at Vik's cool design sense. The contemporary art is first-class. Three windmills lend power; in summer, geothermal energy cools
6	2011	NEWS	of survey show that rates a subtitle: " Exploring the Influence of Sustainability on Contemporary Art. " Practically speaking, that means a lot of pieces assembled from found
7	2015	NEWS	Congress Ave. \$3-\$5 (free on Tuesdays). 512-453-5312, **25;6019;TOOLONG. The Contemporary Austin, Laguna Gloria. " Looking Up, " sculpture by Tom Friedman.
8	1993	NEWS	a spectacular room for residents to cook, dine, relax and entertain. The contemporary kitchen/family room includes two work areas for more than one cook, conversation and dining
9	1997	NEWS	a film. # The television series " Mr. Bean, " which features a contemporary sort of silent-movie clown who blunders through every day escapades with mime and slapstick, had
10	2015	MAG	the part of the church as a whole are two elements obstructing the renewal of contemporary religious life, for every baptized Catholic has a role to play in the task

Empirical studies have also validated the effectiveness of using concordance lines in facilitating L2 vocabulary learning. For instance, Cobb (1999) and Horst, Cobb, and Nicolae (2005) suggest that by inferencing word meanings through concordance lines, L2 learners are able to expose to more natural and informative language contexts. Meeting the unknown words in contexts fosters deep processing of the words and promotes vocabulary acquisition. In addition, Yoon and Hirvela (2004)'s study investigated the issue from L2 learners' perspective, which did not reveal difficulties in implementing the corpus-based approach of using concordance lines.

6. CONCLUSION

Overall, this review aims to provide L2 educators with empirical results from relatively recent studies in teaching L2 vocabulary. Most research in the past decade agrees with the research findings summarized in Folse (2004), merely relying on context clues is not an effective vocabulary learning strategy, especially for L2 learners with low proficiency. However, it is worth noting that the studies did not downplay the role of incidental vocabulary learning from reading. The researchers recognize the potential benefits of extensive reading for vocabulary learning and the advantages of using contextual information for independent L2 learning. Hence, more precise while comprehensive research offers evidences on what types of

vocabulary are more appropriate and likely to be learned from context clues. Lastly, corpus-based approaches, in particular concordance lines, are recommended as an effective strategy of using context clues in digital environment.

İçerik İpuçlarını Kullanarak İkinci Dilde Kelime Öğrenme: Son On Yılda Yapılan Çalışmaların İncelenmesi ve Dijital Ortamdaki Uygulamaları

Özet

Bu çalışmanın amacı, içerik ipuçlarını kullanarak ikinci dil (L2) kelime öğrenme konusunda son on yıl içerisinde yapılmış deneysel çalışmaları incelemektir. Alanyazında yapılmış çalışmalar incelendiğinde, içerik ipuçlarını kullanarak bilinmeyen kelimeleri tahmin etmenin etkili bir kelime öğrenme yöntemi olmadığı görülmüştür. Bu yöntemin tek başına kullanılmasının yerine tamamlayıcı bir yaklaşım olarak kullanılması gerektiği söylenebilir. İncelenen çalışmalarda yabancı dilde kelime öğrenmenin sadece içerik ipuçlarına dayandırılmasının da etkili bir yöntem olmadığı sonucuna varılmıştır. Öğrencilerin dil yeterliliği ile öğrenme faaliyetlerinin gerçekleşmesi arasındaki ilişkinin yüksek olduğu alanyazında ifade edilmiştir. Bununla birlikte yapılan araştırmalarda okuma etkinliklerinin tesadüfi kelime öğrenmede etkili olduğu söylenebilir. Her geçen gün bu alanda çalışan araştırmacılar da içerikleri kullanarak anlam çıkarmak için uygun kelime tiplerini ve etkili öğrenme yöntemlerini keşfetmeye çalışmaktadırlar. Ayrıca bu çalışmada dijital ortamlarda yabancı dil kelime öğretiminin pedagojik etkilerine de yer verilmiştir.

Anahtar Kelimeler: İçerik ipuçları, kelime öğrenme, okuma etkinliği, ikinci dil öğrenimi, dijital öğrenme

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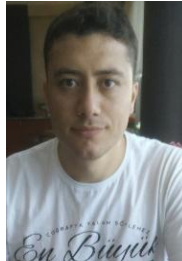
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